Principles of Statistics (Medicine and Dentistry) Formulas' sheet

Standard error

$$\boxed{\sqrt{\frac{P_1(1-P_1)}{n}+\frac{P_2(1-P_2)}{m}}}$$

H_0: $p_1 = p_2 = p$	$z = (\hat{p}_1 - \hat{p}_2)/\sqrt{pq(1/n_1 + 1/n_2)} \sim N(0,1)$ Where p is estimated by $\hat{p} = \frac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1+n_2} = \frac{x_1+x_2}{n_1+n_2}$ If corrected for continuity $z = \frac{\lvert\hat{p}_1 - \hat{p}_2\rvert - \left(\frac{1}{2n_1}+\frac{1}{2n_2}\right)}{\sqrt{\hat{p}\hat{q}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$ Yates-Corrected Chi-Square Test for a 2×2 Contingency Table $X^2 = (\lvert O_{11}-E_{11}\rvert - .5)^2/E_{11} + (\lvert O_{12}-E_{12}\rvert - .5)^2/E_{12} + (\lvert O_{21}-E_{21}\rvert - .5)^2/E_{21} + (\lvert O_{22}-E_{22}\rvert - .5)^2/E_{22}$
Chi-square test for testing relation between two discrete or categorical variables	$X^2 = (O_{11}-E_{11})^2/E_{11} + (O_{12}-E_{12})^2/E_{12} + \cdots + (O_{RC}-E_{RC})^2/E_{RC}$
Chi-square goodness-of-fit test with g groups.	$X^2 = \frac{(O_1-E_1)^2}{E_1} + \cdots + \frac{(O_g-E_g)^2}{E_g}$
Sample Correlation Coefficient	$L_{xx} = \sum_i^n x_i^2 - \frac{(\sum_i^n x_i)^2}{n}$ $L_{yy} = \sum_i^n y_i^2 - \frac{(\sum_i^n y_i)^2}{n}$ $L_{xy} = \sum_i^n x_i y_i - \frac{(\sum_i^n x_i)(\sum_i^n y_i)}{n}$ $r = \frac{L_{xy}}{\sqrt{L_{xx}L_{yy}}}$
$H_0: \rho = 0$	$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$
$H_0: \rho = \rho_0$	$\lambda = (z - z_0)\sqrt{n-3}$ $z = \frac{1}{2}\ln\left(\frac{1+r}{1-r}\right)$
One-Way ANOVA Sum of Squares	$\text{Between SS} = \sum_{i=1}^k n_i\bar{y}_i^2 - \frac{\left(\sum_{i=1}^k n_i\bar{y}_i\right)^2}{n} = \sum_{i=1}^k n_i\bar{y}_i^2 - \frac{y_{..}^2}{n}$ $\text{Within SS} = \sum_{i=1}^k (n_i - 1)s_i^2$

Test of normality

$\bar{X} = \frac{\sum f x_i}{n}$, $S^2 = \frac{\sum f(x^2)}{n-1} - \frac{(\sum f \cdot x)^2}{n(n-1)}$

$X = \frac{lower + upper}{2}$, $\boxed{d.f = n-3}$

$Z = \frac{X - \mu}{\delta} \rightarrow \frac{X - \bar{X}}{S}$

only if $n_1 \cdot P^* \cdot q^* \geq 5$
$n_2 \cdot P^* \cdot q^* \geq 5$

$\boxed{E = \frac{\sum R * \sum C}{grand_{tot}}}$

$\boxed{d.f = 1}$

none of the four expected values is less than 5

• no more than 1/5 of cells have expected values < 5
• no cell < 1

$\boxed{d.f = (R-1)(C-1)}$

$\boxed{df = catogeries - 1}$

$\boxed{r = \frac{Sxy}{Sx \; Sy}}$ Sample co-variance; Sample x std; Sample y std

$\boxed{Sxy = \frac{Lxy}{n-1}}$

one sample t-test for correlation coefficient

$\boxed{d.f = n-2}$

one sample z-test

fisher's transformation

sample

$\boxed{Z_0 = \frac{1}{2}\ln\left(\frac{1+P_0}{1-P_0}\right)}$

$\boxed{variance = \frac{1}{n-3}}$

interval estm.

$Z_1 = Z - \frac{Z_{\alpha/2}}{\sqrt{n-3}}$

$Z_2 = Z + \frac{Z_{\alpha/2}}{\sqrt{n-3}}$

$P(P_1, P_2)$

$P_1 = \frac{e^{2Z_1} - 1}{e^{2Z_1} + 1}$

$P_2 = \frac{e^{2Z_2} - 1}{e^{2Z_2} + 1}$

$\boxed{* \; MSB = \frac{SS_B}{K-1} = \frac{\sum n_i (X_i - X_{GM})^2}{K-1}}$

$\boxed{* \; MSW = \frac{SSW}{N-K} = \frac{\sum (n_i - 1) S_i^2}{N-K}}$

$\boxed{X_i = \frac{\sum x_i}{n}}$, $\boxed{S_i^2 = \frac{\sum (X - \bar{X})^2}{n-1}}$ → for each sample

$\boxed{X_{GM} = \frac{\sum X}{N}}$

$\boxed{F_{test} = \frac{MSB}{MSW}}$

Short computational form

* $\boxed{Between \; SS = \sum n_i x_i^2 - \frac{(\sum n_i y_i)^2}{n}}$
* $\boxed{within \; SS = S_i^2 (n_i - 1)}$